

***Didymoplexiella cinnabarina* (Orchidaceae): a New Species from Muller Range, Central Kalimantan, Indonesia**

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A new species of the genus *Didymoplexiella* (Orchidaceae), *D. cinnabarina*, is described and illustrated. This saprophytic/mycoheterotrophic orchid was found in the Muller Range, Central Kalimantan, Indonesia. A combination of several characters, such as long, decurved stelidia, the absence of a column foot, a trilobed lip, and clear coloration, indicates that this species belongs to the genus *Didymoplexiella*. It is clearly distinct from other known species of *Didymoplexiella* in the vermilion-red coloration of the entire inflorescence and flowers, and the moderate size of its flowers. It most resembles *D. kinabaluensis*, which was collected from Menetendok Gorge, Kinabalu, Sabah, Borneo, but differs in color and lip morphology. This species is the eighth species of the genus reported so far.

Key words: achlorophyllous, Central Kalimantan, *Didymoplexiella cinnabarina*, flora, Malesia, mycoheterotroph, new species, Orchidaceae

The genus *Didymoplexiella* Garay (Orchidaceae) consists of seven species of mycoheterotrophs (Garay 1954, Xiaohua *et al.* 2004), and most of these species have been collected in Indonesia. *Didymoplexiella* is distinguished from a very similar genus, *Didymoplexis*, in having long stelidia on the tip of the column and lacking a distinct column foot. From these characters, Ridley originally distinguished plants from genus *Didymoplexis* Griff., and proposed a new genus *Leucoleana*. Since the name of *Leucoleana* had already been used within the family Umbelliferae, later, Garay (1954) proposed genus *Didymoplexiella*. To date, seven species have

been reported to distribute in mainly in Indonesia, extending to Malaysia, Thailand, China and Japan. Four species of *Didymoplexiella* have been listed from Borneo, namely, *D. borneensis* (Schltr.) Garay, *D. forcepata* (J. J. Sm.) Garay, *D. kinabaluensis* (Carr) Seidenf., and *D. ornata* (Ridl.) Garay. While making collections for floristic research in the Muller Range, Central Kalimantan, Indonesia, we found a species of *Didymoplexiella* (Fig. 1) that resembles *D. kinabaluensis* (Carr) Seidenf. collected from Menetendok Gorge, Kinabalu, Sabah, Malaysia (Borneo). Detailed comparison with related species revealed this to be a new species of

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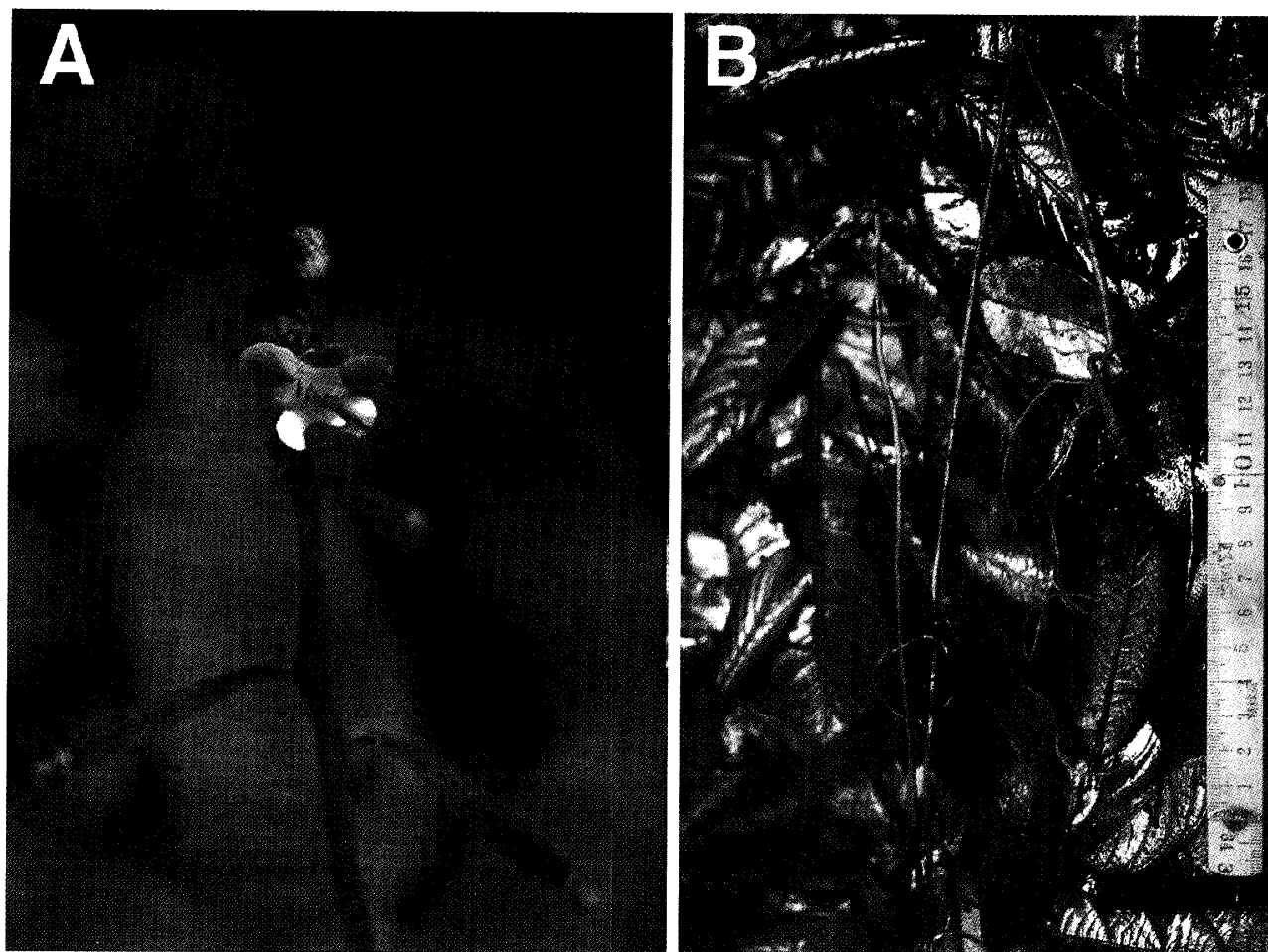


FIG. 1. *Didymoplexiella cinnabarina* H. Tsukaya, M. Nakajima et H. Okada in its native habitat. A, Inflorescence. A part of the lip was broken, possibly from insect herbivory. B, Whole plant. Unit of scale, 1 cm. Photographs were taken in the native habitat in the Muller Range, Central Kalimantan on 21 December 2004.

Didymoplexiella. Here the species is formally named and described as *D. cinnabarina* H. Tsukaya, M. Nakajima et H. Okada.

***Didymoplexiella cinnabarina* H. Tsukaya, M. Nakajima et H. Okada, sp. nov. (Figs. 1, 2)**

Ex toto speciebus descriptis inflorescentia, vaginis, seplasi petalis lateribusque rufescentis vel cinnabarinis differt. Ex affinitate *Didymoplexiellae kinabaluensi* (Carr) Seidenf. inflorescentia rufescenti et distincte longiore (usque ad 60 cm longa), sepalis petalis laterilibusque cinnabarinis, labio albo integra nec denticulato satis distinguenda.

Typus: INDONESIA, Central Kalimantan: Dist Murung Raya; Muller Range behind Tumbang

(Village) Naan, near Muara Sapan, ca. 170 m altitude, along Sungai Joloi, almost the halfway point, about 30 minutes walk from Muara Sapan (00°12'22" N, 113°31'23" E) to Camp II, Sungai (River) Lapangan (00°11'00" N, 113°31'59" E), under tropical rain forest, 21 December, 2004, H. Okada, H. Nagamasu, H. Tsukaya, A. Takano & A. Naiki KT-412 (holotype: BO [fl. & tuber]; isotype: TI [fl. bud]).

Saprophytic/mycoheterotrophic plants; **tuber** creeping, cylindrical, 3.7 cm or more long, emitting 4-5 slender roots near the apex (Fig. 1B). **Inflorescence** erect, elongate, slender, vermilion-red, peduncle ca. 60 cm or longer, bearing ca. 10 flowers (Fig. 1A). **Sheaths** ca. 0.7 cm long. **Pedicellate ovary** ca.

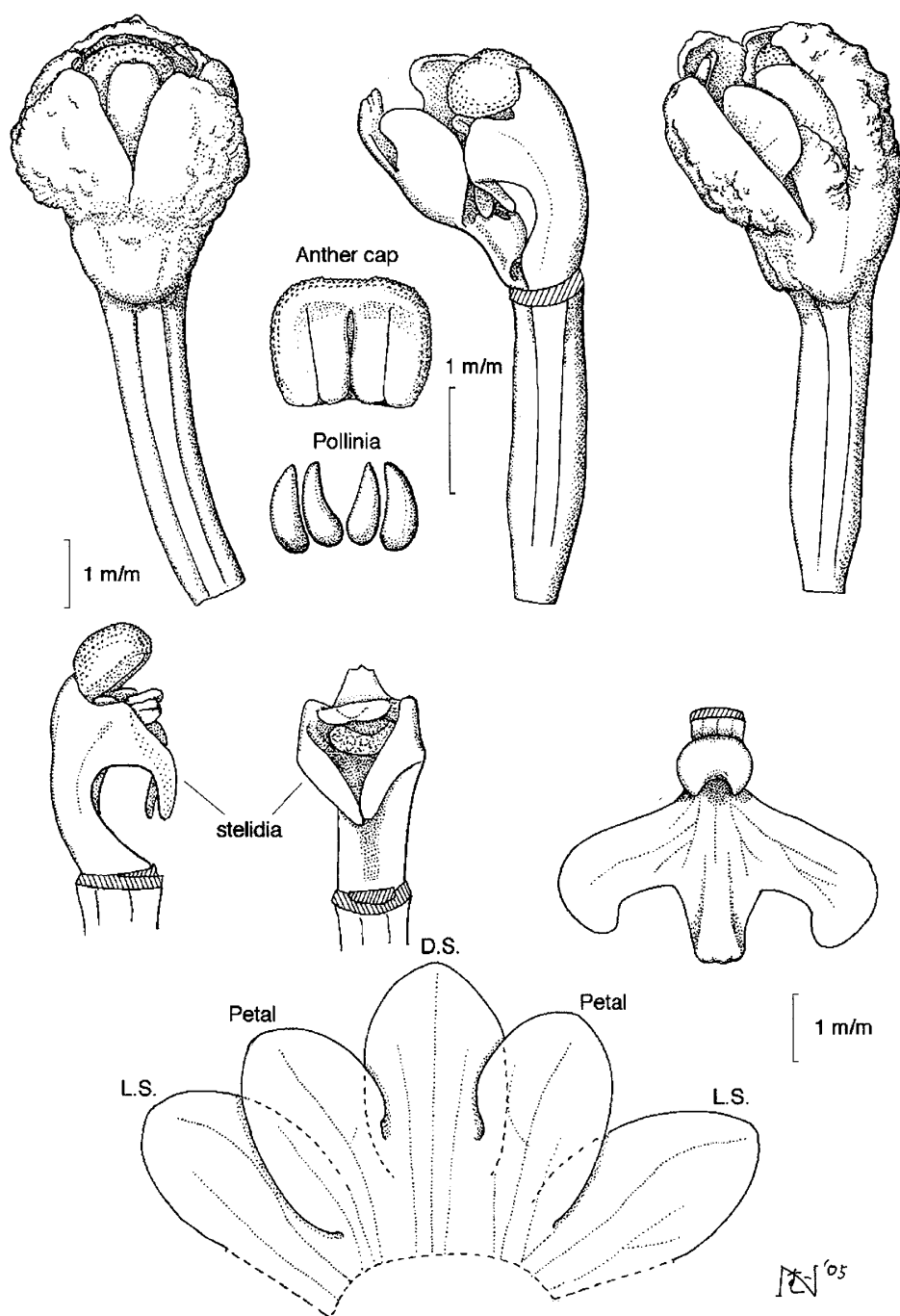


FIG. 2. Flower structure of *Didymoplexiella cinnabarina* H. Tsukaya, M. Nakajima et H. Okada, drawn from a flower bud just before anthesis (H. Okada et al. KT-412, isotype). Note elongated stelidia. D.S., dorsal sepal; L.S., lateral sepal.

0.7 cm long, vermilion-red. **Flowers** ca. 1.3 cm across, vermilion-red except for the lip and basal part of sepals and petals, which are white (Fig. 1). Sepals and petals vermilion-red with basal part white, ca. 5-6 mm long, ca. 4 mm wide, connate at

the base with each other for 20-40% of their length, free parts ovate, obtuse, sparsely warty abaxial side (Fig. 2). Lip three lobed, ca. 4 mm or more long, 10 mm wide, with a yellowish callus which is obscurely bilobed in front (Figs. 1, 2). Column ca. 3 mm

tall, white, with long stamens curved downwards, ca. 2 mm long, on either side of the stigma, without column foot (Fig. 2). Anther cap broadly oval, covered with papillose cells; pollinia four (Fig. 2).

Notes: Garay (1954) distinguished the genus *Didymoplexiella* from *Didymoplexis* Griffith by the pair of long stamens on either side of its stigma, and the lack of a column foot. Moreover, known species of *Didymoplexiella* all have a trilobed lip. It is also noteworthy that some of the species show deep coloration in their inflorescence (e.g., brown for *D. hainanensis* X. H. Jin & S. C. Chen, dull brown-purple for *D. kinabaluensis*, green with red stripes for *D. ornata*, pale purple for *D. siamensis* (Rolfe ex Downie) Seidenf., and brown-green or chocolate brown for *D. trichechus* (J. J. Sm.) Garay). The new species described here, *D. cinnabarina* also has the set of characters of members of *Didymoplexiella*. The most striking difference of *D. cinnabarina* from other known species is the coloration. *Didymoplexiella cinnabarina* is unique in showing vermilion-red color in the inflorescence stem, sheaths, and floral organs, except for a white lip (Fig. 1), although slight variation in color may occur among populations of this species, as is known for flowers of *D. trichechus*, which vary from brown-green with a white center to chocolate brown (Comber 2001).

Besides its color, morphological characters also indicate that *Didymoplexiella cinnabarina* differs from other known species of the genus *Didymoplexiella*. *Didymoplexiella cinnabarina* is the tallest of the already known species, at more than 60 cm in length, while *D. hainanensis* and *D. siamensis*, the smallest members of this genus, are only 5–24 cm long (Xiaohua *et al.* 2004, Downie 1925). The flowers are larger than those of *D. forcepata*, whose flowers are only 3.4 mm in length (Smith 1927), and similar to *D. ornata* and *D. kinabaluensis*, at ca. 1 cm in diameter. As in all species of this genus, *D. cinnabarina* has fused sepals and petals, but the degree of fusion is rather low. Dorsal sepals of *D.*

ornata and *D. borneensis* are joined to the petals for at least half of their length (Comber 2001, Ridley 1891, Schlechter 1911), while those of *D. cinnabarina* are joined to the petals for less than half of their length, as in *D. kinabaluensis* (Carr 1935; Fig. 2).

Thus, the most similar species to *Didymoplexiella cinnabarina* reported from Borneo is *D. kinabaluensis*. The inflorescence length of *D. kinabaluensis* is shorter than that of *D. cinnabarina* (up to 39 cm in *D. kinabaluensis* vs. more than 60 cm in *D. cinnabarina*), and has different coloration (dull brown-purple inflorescence with dull brown-purple sepals and petals, with a white lip on which blue-green callus is seen: Carr 1935). More significantly, *D. kinabaluensis* differs from *D. cinnabarina* in the lack of a denticulate margin on the lip (Fig. 2), whereas *D. kinabaluensis* has a lip with a faintly erose margin of side lobes (Carr 1935). Another difference in the lip of these two species is a triangular acuminate midlobe for *D. kinabaluensis* and a square obtuse midlobe for *D. cinnabarina*.

Another very similar species to *Didymoplexiella cinnabarina* is *D. trichechus*, which is known to be endemic to Sumatra (Comber 2001). *D. trichechus* is similar to *D. kinabaluensis* in having a trilobed lip with the midlobe much smaller than the side lobes, as in *D. kinabaluensis* (Smith 1920). Again, *D. trichechus* has a smaller inflorescence than does *D. cinnabarina* (ca. 27 cm long for *D. trichechus*: Comber 2001), and the color of the flowers differs from *D. cinnabarina* as described above (brown-green or chocolate brown for *D. trichechus*: Comber 2001). Moreover, the side lobes of *D. trichechus* are denticulate as in *D. kinabaluensis* (Smith 1920, Comber 2001). As noted above, *D. cinnabarina* does not have a denticulate margin on the side lobes, suggesting that *D. kinabaluensis* and *D. trichechus* are the most closely related set of species, and *D. cinnabarina* may be the second-closest relative to *D. kinabaluensis*.

Didymoplexiella cinnabarina is the fifth species of the genus *Didymoplexiella* discovered from

Key to the species of *Didymoplexiella* in Borneo

Mycoheterotrophs that have slender stems arising from an underground fleshy tuber. Sepals and petals are joined at the base, the lip is neither saccate nor spurred. Plants are similar to *Didymoplexis*, but differ in that the column is long and slender with two distinct stelidias, and are without a column-foot. Lips trilobed.

- 1. Flowers less than 5 mm in length 2
 - 2. Lateral sepals connate only at the base..... **D. forcepata**
 - 2. Lateral sepals connate for two-thirds of their length..... **D. borneensis**
- 1. Flowers more than 10 mm in length 3
 - 3. Dorsal sepal connate with the petals for at least half of their length..... **D. ornata**
 - 3. Dorsal sepal connate with the petals for less than half of their length 4
 - 4. The midlobe of the trilobed lip much smaller than the side lobes. Side lobes with faint denticulate margins. Flowers dull brown-purple **D. kinabaluensis**
 - 4. The midlobe of the trilobed lip slightly smaller than the side lobes. Margins of the side lobes not denticulate. Flowers vermilion-red **D. cinnabarina**

Borneo, and the eighth species of the genus in the world. Based on comparative data, the key to species of *Didymoplexiella* is mentioned above.

Distribution and ecology: *Didymoplexiella cinnabarina* is only known from the type locality in Muller Range, Central Kalimantan. The locality was a wet, disturbed tropical hill, evergreen rain forest containing tall trees, e.g., *Shorea* spp. (Dipterocarpaceae) and *Lithocarpus* spp. (Fagaceae), and small trees such as *Agrostistachys* sp., *Aposusa* sp., *Baccaurea* sp., *Mallotus* spp. (Euphorbiaceae), *Garcinia* spp. (Guttiferae), *Ardisia* spp., *Labisia* sp. (Myrsinaceae), *Urophyllum* sp., *Psychotria* spp., *Lasianthus* spp. (Rubiaceae), and others. We collected this plant in the rainy season; during the intensive expedition in which we made this collection, we did not find any other individuals.

During this botanical survey in the Muller Range in 2004, we also found a new species of *Thismia* (Burmanniaceae) that is also a saprophytic/mycoheterotrophic plant (Tsukaya & Okada 2005). Considering that two new species of mycoheterotrophs were found during this rather short (ca. two weeks) survey, further botanical surveys are likely to find more new species of mycoheterotrophs

in this area. Expeditions in the rainy season are difficult to conduct; however, they may be necessary in order to reveal the biodiversity of these short-lived mycoheterotrophs.

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